

INDOOR PARTICULATE MATTER CONCENTRATIONS ARE HIGHER DURING AFRICAN DUST SEASON IN HOMES OF CHILDREN WITH ASTHMA IN BARBADOS

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Background and Aims: Childhood asthma is a significant public health problem in Barbados and air quality may be a contributing factor. Ambient particulate matter (PM) concentrations in Barbados are influenced by seasonal global transport of African dust plumes. Ambient and indoor concentrations can negatively impact respiratory health in susceptible populations. In a panel study to demonstrate feasibility of assessing asthma and the relationship to African dust exposure, PM was measured in homes of asthmatic children in Barbados during 2 seasons: low African dust (season 1) and high African dust (season 2).

Methods: Twenty-six asthmatic children in Barbados were studied for 5 days, January-February 2010 (season 1), and 19 children completed a second 5-day monitoring period in July 2010 (season 2). Home indoor environmental monitoring set-ups collected integrated PM samples and passive second-hand smoke/nicotine (SHS) for 5 days. Children completed daily lung function testing during the study period.

Results: Indoor $PM_{2.5}$ and PM_{10} concentrations were 26 and 21% higher during season 2 than season 1 (8.3 ± 3.2 versus 11.2 ± 5.7 $\mu g/m^3$, $p=0.04$ for $PM_{2.5}$ and 26.5 ± 10.0 versus 33.0 ± 11.4 $\mu g/m^3$, $p=0.03$ for PM_{10} , respectively). Increases in $\log PM_{2.5}$ and $\log PM_{10}$ tended to be associated with decreases in percent-predicted FEV_1 ($p=0.06$ and $p=0.16$ respectively). Most SHS samples (78%) were below the LOD; those >LOD were low concentrations (0.007 - 0.1 $\mu g/m^3$).

Conclusions: To our knowledge, this is the first study to measure the relationship between African dust and indoor home environments in Barbados. Indoor PM concentrations in homes of asthmatic children were significantly higher during the African dust season and increases in PM were linked to decreased percent-predicted FEV_1 . The findings of this pilot study support the need for research investigating effects of global transport of African dust on respiratory health in Barbados and other affected geographic locations.